

No. 811,176.

PATENTED JAN. 30, 1906.

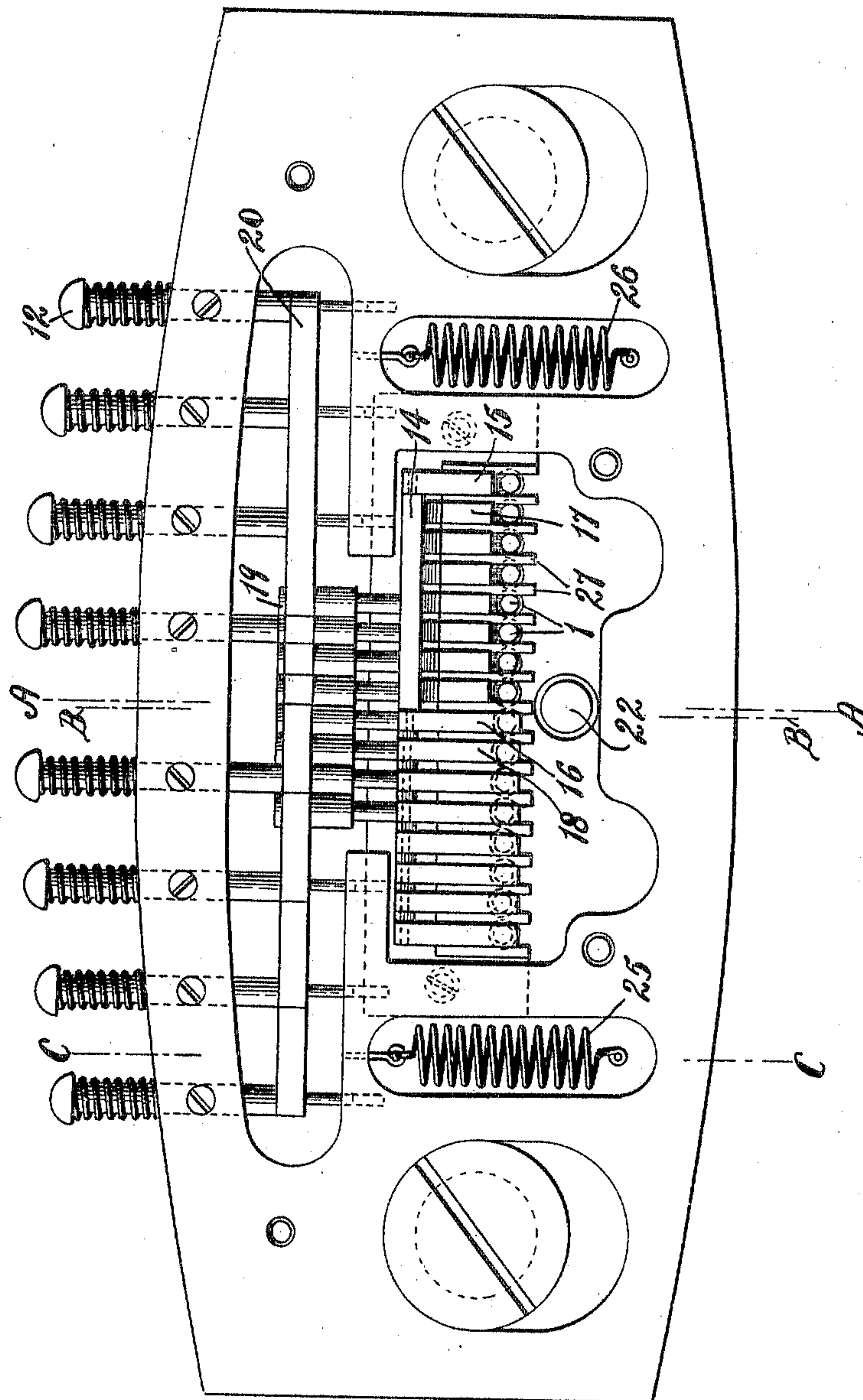
V. E. ROYLE.

PIANO MACHINE HEAD FOR PUNCHING JACQUARD CARDS.

APPLICATION FILED JAN. 13, 1904.

5 SHEETS—SHEET 1.

Fig. 1.



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Inventor:

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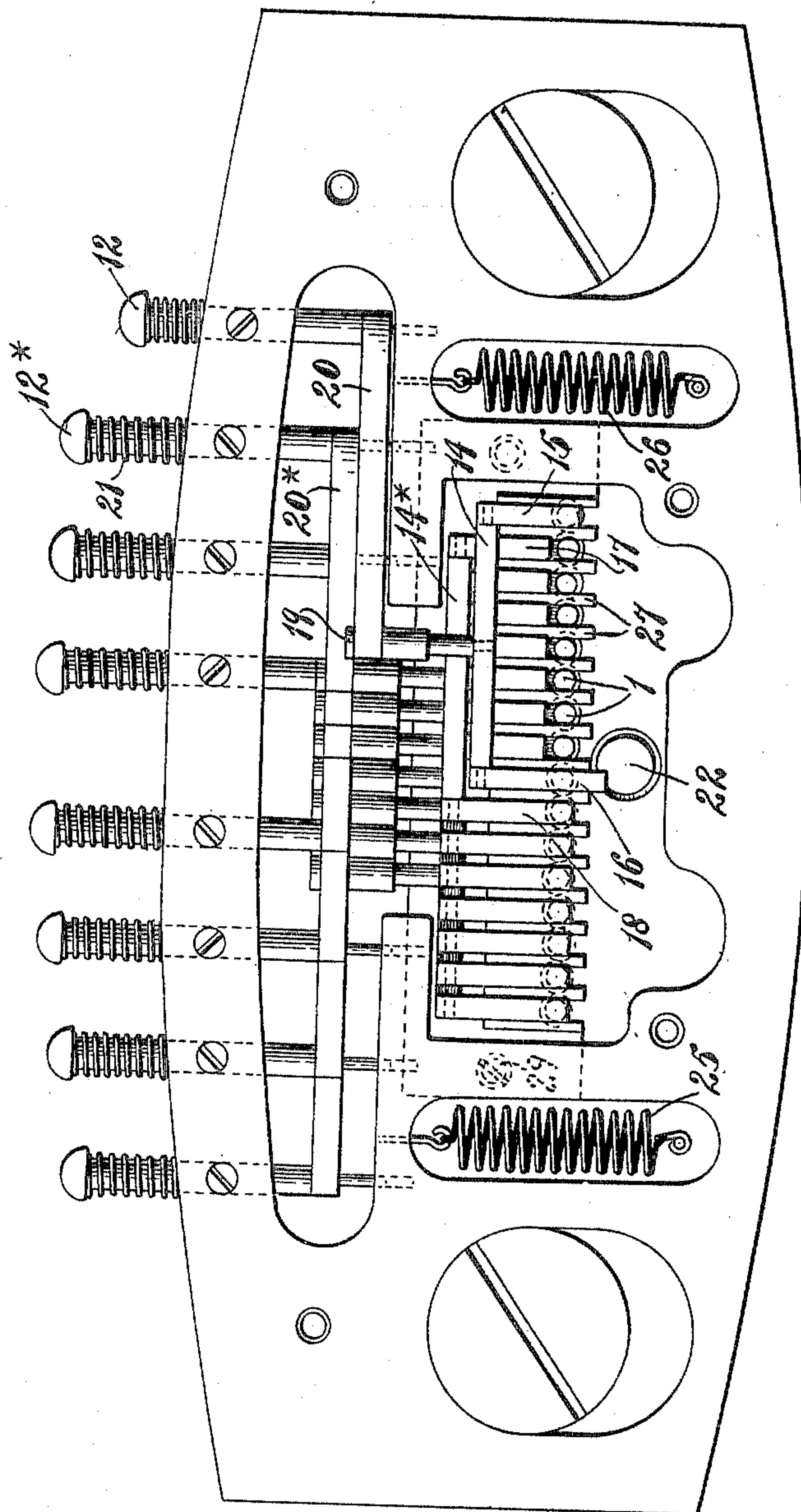
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5 SHEETS—SHEET 2.

Fig. 2.



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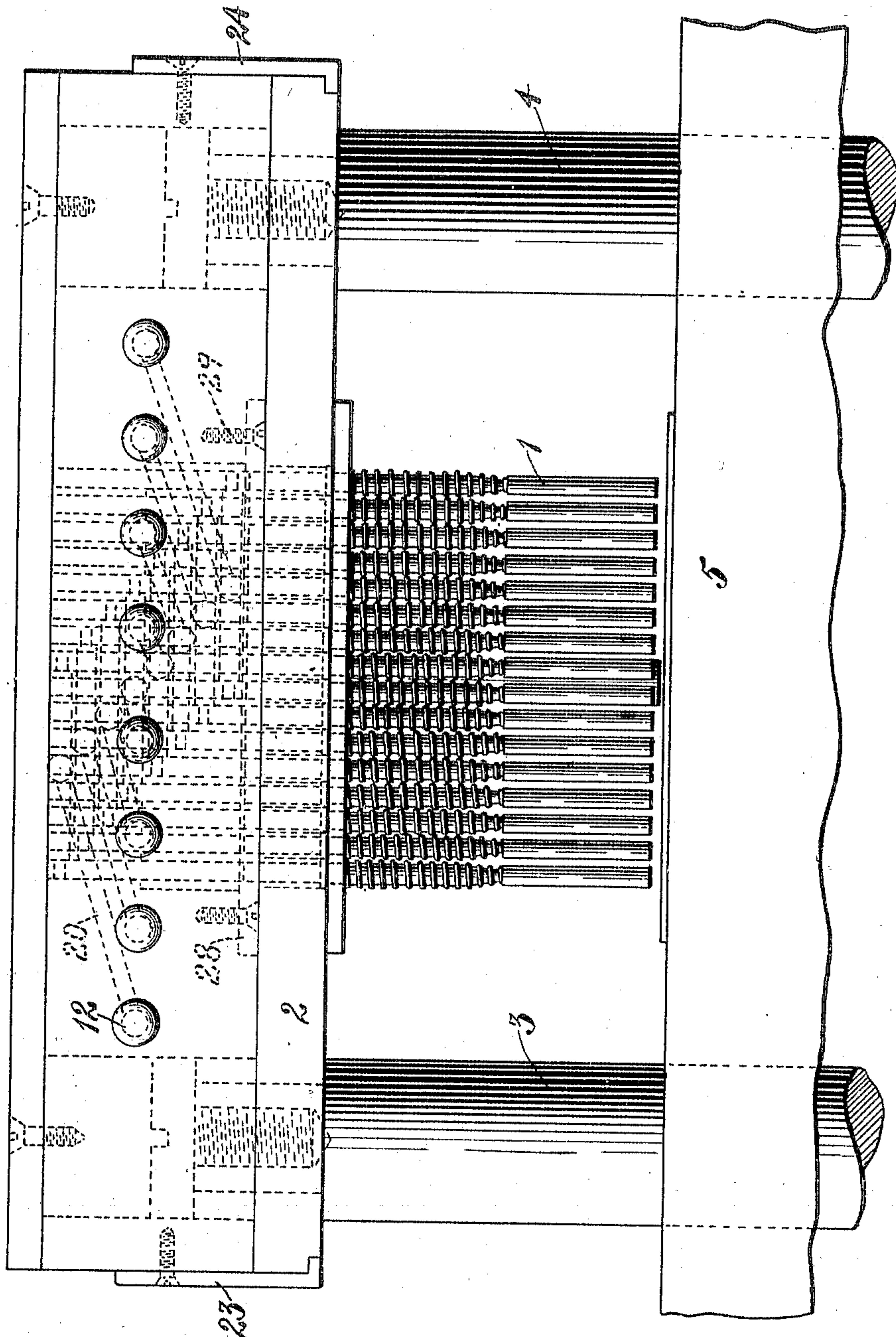
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5 SHEETS—SHEET 3.

Fig. 3.



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5 SHEETS—SHEET 4.

Fig. 5.

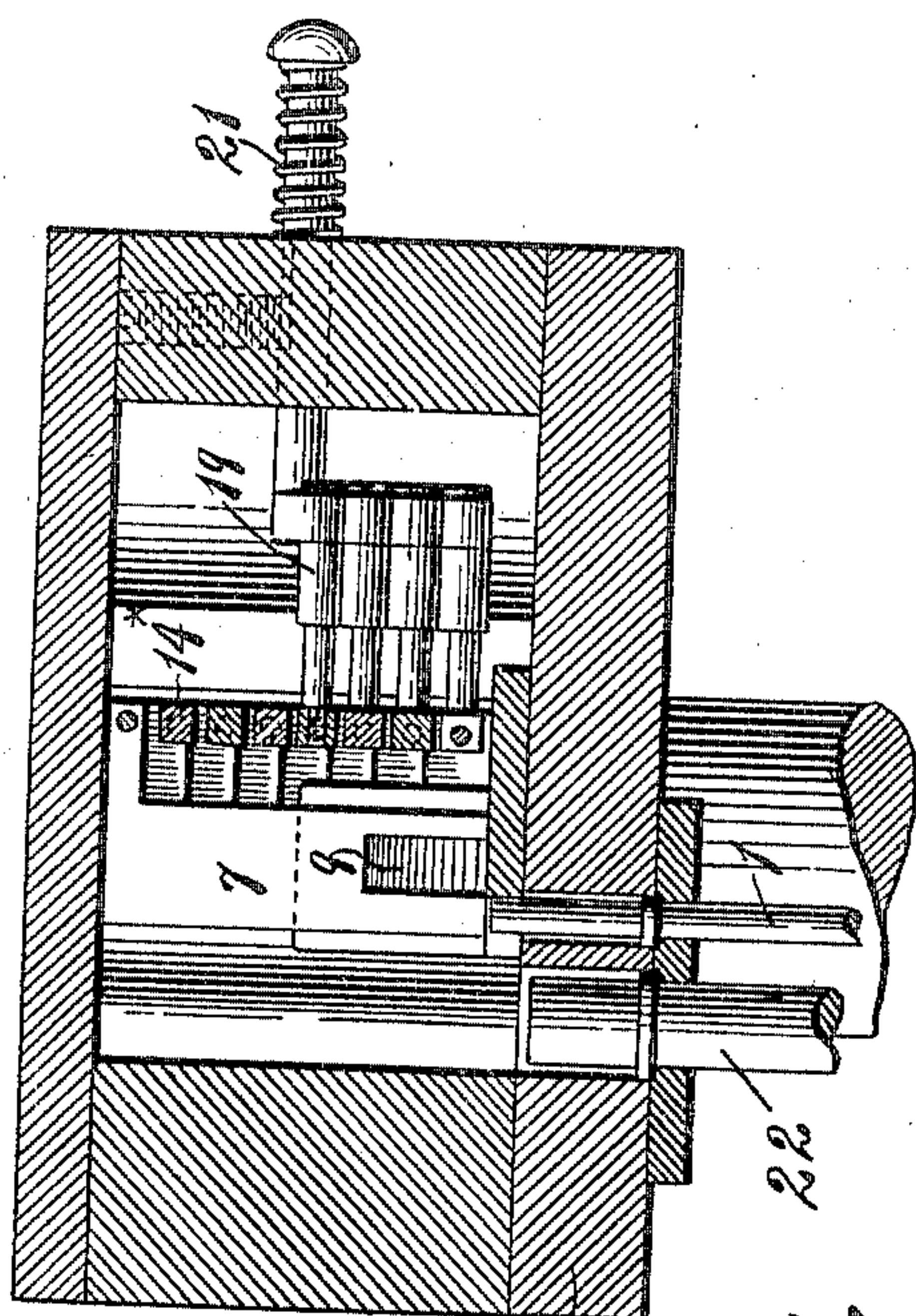
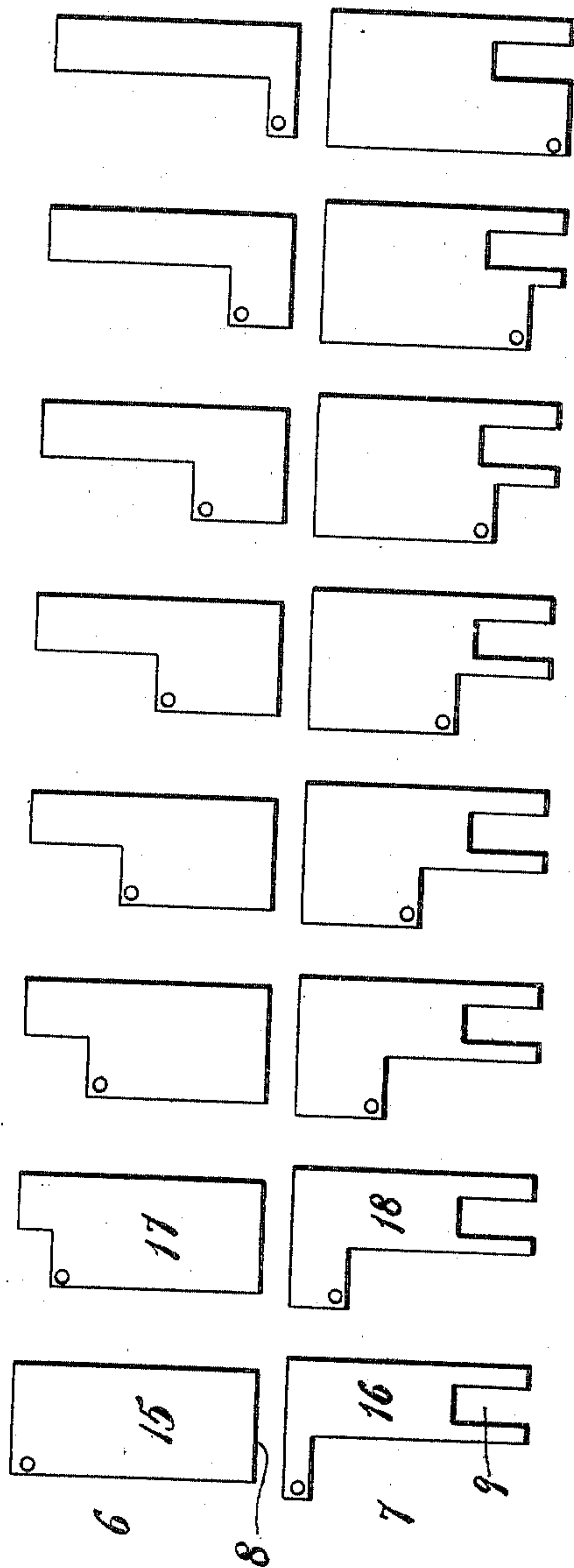
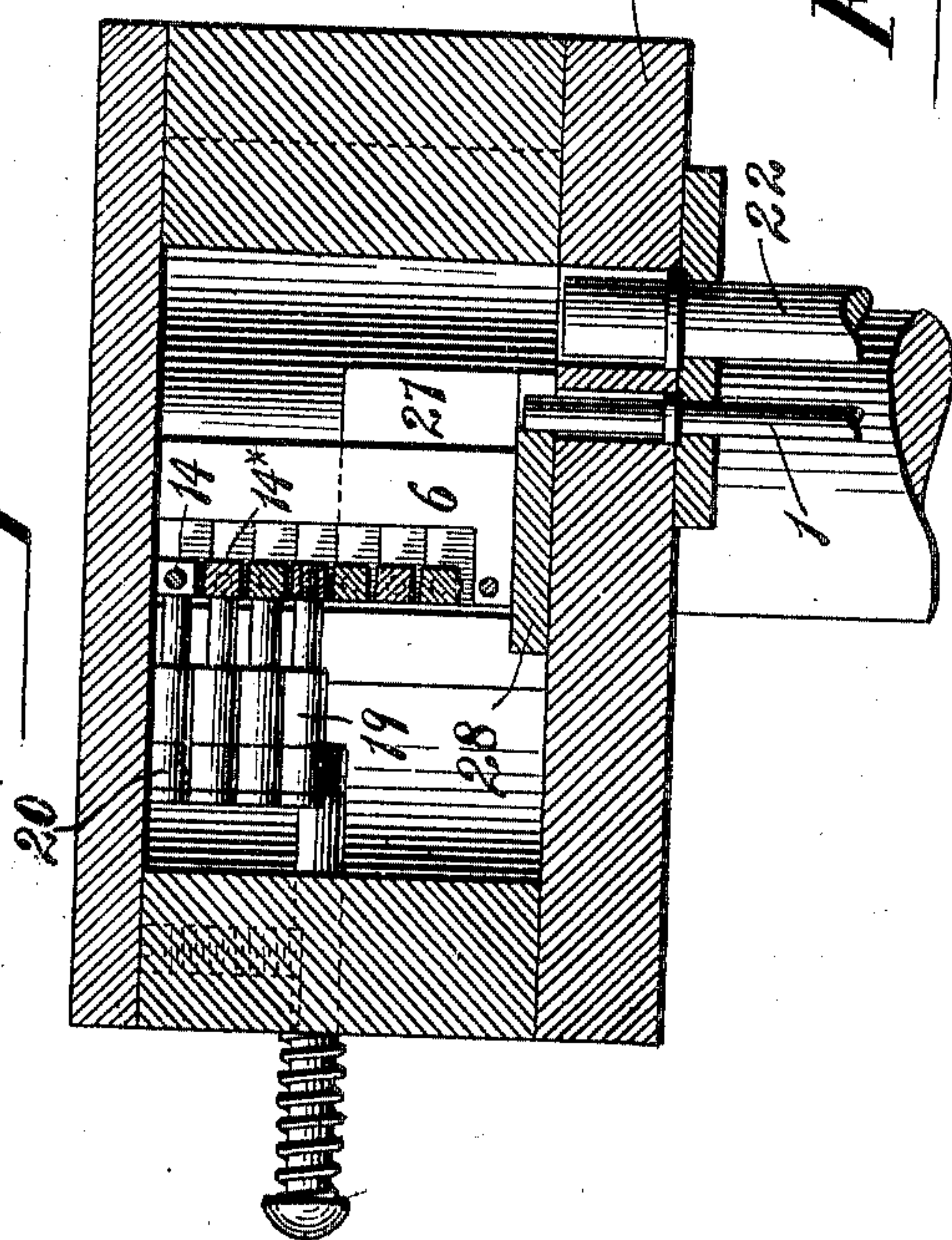


Fig. 11.

Fig. 4.



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UNITED STATES PATENT OFFICE.

VERNON E. ROYLE, OF PATERSON, NEW JERSEY.

PIANO MACHINE-HEAD FOR PUNCHING JACQUARD-CARDS.

No. 811,176.

Specification of Letters Patent.

Patented Jan. 30, 1906.

Application filed January 13, 1904. Serial No. 188,901.

To all whom it may concern:

Be it known that I, VERNON E. ROYLE, a citizen of the United States, and a resident of Paterson, in the county of Passaic and State of New Jersey, have invented a new and useful Piano Machine-Head for Punching Jacquard-Cards, of which the following is a specification.

My invention relates to piano machine-heads for punching jacquard-cards, with the object in view of providing simple and effective means for controlling a number of punches greater than the number of keys and at the same time providing an arrangement which will admit of the keys being set in such relation to one another as may be best suited to the hands of the operator.

A further object is to provide for changing the pattern by varying the arrangement of the slides actuated by the keys for locking and releasing the punches.

In the accompanying drawings, Figure 1 is a top plan view of the head with the covering-plate removed, showing the parts in the position which they normally assume. Fig. 2 is a similar view showing one of the keys pressed inwardly. Fig. 3 is a view in rear elevation, showing the punches in their position relative to the head. Fig. 4 is a vertical section from front to rear in the plane of the line A A of Fig. 1 looking toward the right as the drawing is held. Fig. 5 is a similar view in the plane of the line B B of Fig. 1 looking toward the left as the drawing is held. Fig. 6 is a similar view in the plane of the line C C of Fig. 1 looking toward the left. Fig. 7 is a top plan and end view in detail of the slide supporting and guiding bolster. Fig. 8 is a plan and end view of one of the tie-bars for connecting two of the slides to work in unison. Fig. 9 is a view of one of the studs for connecting the tie-bar with a link. Fig. 10 is a view of four different lengths of links for connecting the keys with the studs, and hence with the tie-bars. Fig. 11 is a view of the different slides in elevation; and Fig. 12 is a plan view of one of the cards, showing one of numerous patterns which may be punched by manipulating the keys, and hence the slides for controlling the punches.

In my present invention I have provided for manipulating sixteen punches by eight

keys, each key being connected up with two slides for controlling two of the sixteen punches. While this at present is the preferred number, it will be understood that some of the keys may have more or less than two slides connected therewith, as may be found desirable.

The punches (denoted by 1) are supported in the base 2 of the head and are simultaneously lowered and raised by means of the bars or rods 3 and 4, which support the head and which are connected in any well-known or approved manner with mechanism for lifting them and the head bodily and lowering them and the head bodily toward the platen or card-support 5. As my present invention is directed to the slides for locking and releasing the punches and to the means for manipulating them, a more detailed description of the punch-head and its operating mechanism will be omitted.

The term "slide" as used in the following explanation and claims is intended to apply to a movable piece, in the present instance a plate of metal, which is caused to travel horizontally into position to lock or release a punch to cause it to perforate the card or rest idly on the surface of the card as the punch-head is lowered.

There are in the present instance sixteen slides, one for each punch, those on the right hand of the center as the drawing Fig. 1 is held being indicated as the series 6 and those on the left of the center as the drawing Fig. 1 is held being denoted as the series 7. The lower ends 8 of the series 6, with which the tops of the punches engage when the slides are moved into locking adjustment, are free from recesses or indentations, while the lower ends of the series 7 are provided with recesses 9, spaced in each instance the same distance from the front or advance edge of the slide, and when in their normal positions the series 6, as shown in Fig. 4, rest back of the line of punches far enough to permit the punches to work idly, while the series 7 of slides rest normally, as shown in Fig. 5, with that part in advance of the recess 9 over the punches in locking position. Thus if the head were lowered without manipulating the keys and the card (denoted by 10) were placed on the platen in position to be oper-

ated on by the punches a series 11 of eight holes would be punched at the left of the central line of the card, while the card at the right of the central line would remain blank because
 5 of the punches governed by the series 6 of the slides being free to lift when the head is lowered. If the card be then advanced one step and all the keys be pressed toward the front in the manner in which the key 12, Fig. 2, is
 10 shown pressed to the front, the series of slides 6 will be moved into position to lock the punches which they govern, while the series of slides 7 will be moved into position to permit the punches to lift idly in the recesses 9
 15 in the slides, and if the head be lowered while the keys are so pressed the card 10 will be punched with a series 13 of eight holes to the right of the center of the card, while the card to the left of the center will remain intact, the
 20 punches which engage it being lifted by the card into the recesses 9 as the head is lowered.

The eight keys are in the present illustration of my invention arranged to control the
 25 sixteen punches, as follows: Each slide in the series 6 is connected with a slide in the series 7 by means of a tie-bar 14. (Shown in detail in Fig. 8.) These tie-bars 14 are arranged parallel, as shown in dotted lines, Fig. 3, the
 30 bar 14, Fig. 2, connecting the slide 15 of the series 6 with the slide 16 of the series 7, the bar 14* connecting the slide 17 of the series 6 with the slide 18 of the series 7, and so on in succession throughout the series, the upper
 35 corners of the series 6 being cut away at different depths to permit the tie-bars 14 14*, &c., to pass over the intermediate slides and the slides in the series 7 having their lower corners cut away to permit the tie-bars to
 40 pass underneath the intermediate slides, the arrangement being such that the tie-bars 14 14*, &c., may be arranged in a vertical bank, thus materially economizing space. Each
 45 of the tie-bars is connected, by means of a stud or post 19, (shown in detail in Fig. 9,) with one end of one of the links, (denoted by 20 20*, &c., see Fig. 10,) the opposite end of the said link being connected with the inner
 50 end of a key 12 12*, &c. The studs or posts 19 are preferably connected with the tie-bars at a point about midway between the ends of the bar, and the links 20 20*, &c., are of such
 length and lead in such directions from the posts 19 as to reach the keys 12 12*, &c., and
 55 said lengths may be lengthened or changed in shape to suit the positions of the keys, whatever be their respective relations to one another—viz., whether they be the same distance apart or different distances or whether
 60 they be in a straight line or in a curved line.

The keys are held normally at the limits of their outward throw, as is usual, by means of

springs 21, coiled thereon, and for purposes of locking the punch 22 for punching the peg-hole in the card in its position to punch I
 65 have made the portion of the punch-head above the base 2 movable away from and toward the operator by providing it with guides 23 24, which extend down the opposite ends
 70 of the base 2 and project a distance underneath the opposite ends of the base, the head to which the guides 23 and 24 are attached having a limited sliding movement on the
 75 base 2 and being held normally in position (shown in Figs. 1 and 2) by means of retracting-springs 25 26, connected at one end to the base 2 and at the opposite end to the portion
 of the head above the base.

The slides for locking the punches are guided between guide plates or flanges 27, 80
 uprising from a plate or bolster 28, which is screwed to the movable portion of the head by means of screws 29 and provided intermediate of the guide plates or flanges 27 with
 slots 30 for the reception of the upper ends of
 85 the punches 1.

What I claim is—

1. The combination with the punches and slides for locking and releasing the punches, of tie-bars rigidly connecting a plurality of
 90 slides, operating-keys and links of different lengths for connecting the keys with the tie-bars.

2. The combination with the punches and slides arranged to lock and release the
 95 punches, of tie-bars connecting non-adjacent slides to move in unison, operating-keys and links of different lengths for connecting the operating-keys with the tie-bars for placing
 the slides under the control of the keys. 100

3. The combination with the punches and slides for locking and releasing the punches, certain of the slides being provided with recesses in their lower ends and resting normally in locking position while other slides
 105 rest normally out of locking position, of tie-bars each arranged to connect one of the slides which is normally out of locking position with a slide normally in locking position, operating-keys and links of varying lengths
 110 for connecting the operating-keys with the tie-bars to simultaneously move the slides in the same direction one into and another out of locking position.

4. The combination with the punches and
 115 the slides arranged to lock and release the punches, of tie-bars each connecting a plurality of slides, operating-keys and links of varying lengths for connecting the keys with the tie-bars whatever may be the position of the
 120 keys with respect to the tie-bars.

5. The combination with the body of the head, the punches, slides for locking and releasing the punches and a slide-supporting

plate or bolster separate from the head and
located therein and provided with guide-
flanges for directing the movements of the
slides, of tie-bars connecting the slides in
5 groups and extending along recesses formed
in intermediate slides and means for operat-
ing the tie-bars and hence the slides.

In testimony that I claim the foregoing as

my invention I have signed my name, in
presence of two witnesses, this 11th day of 10
December, 1903.

VERNON E. ROYLE.

Witnesses:

FREDK. HAYNES,
C. S. SUNDGREN.